

Creative Commons distribution of digital content

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Rights in the digital space

- “Light-weight” governance allows rights holders to release content for others to freely access it but without making it public domain
- Creative Commons (CC) licences are a great solution, but so far have been mostly used having in mind *human* users
- To harness the potential of “light-weight” governance *machines*, not only humans, should be capable of “managing rights”
- Licences are important, but there is more...

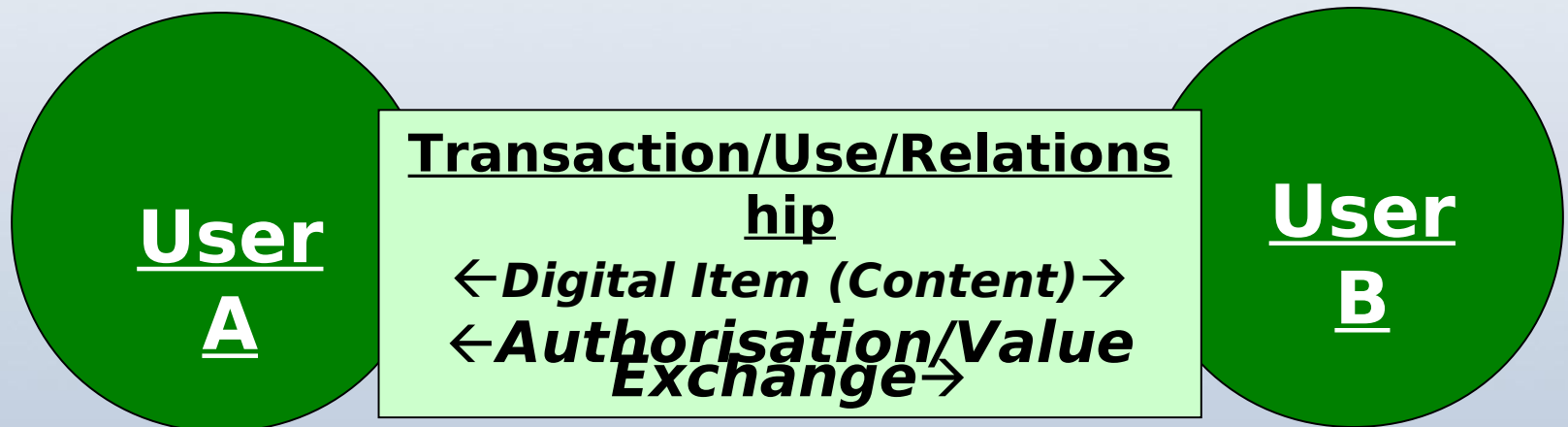
MPEG-21

“Multimedia framework”

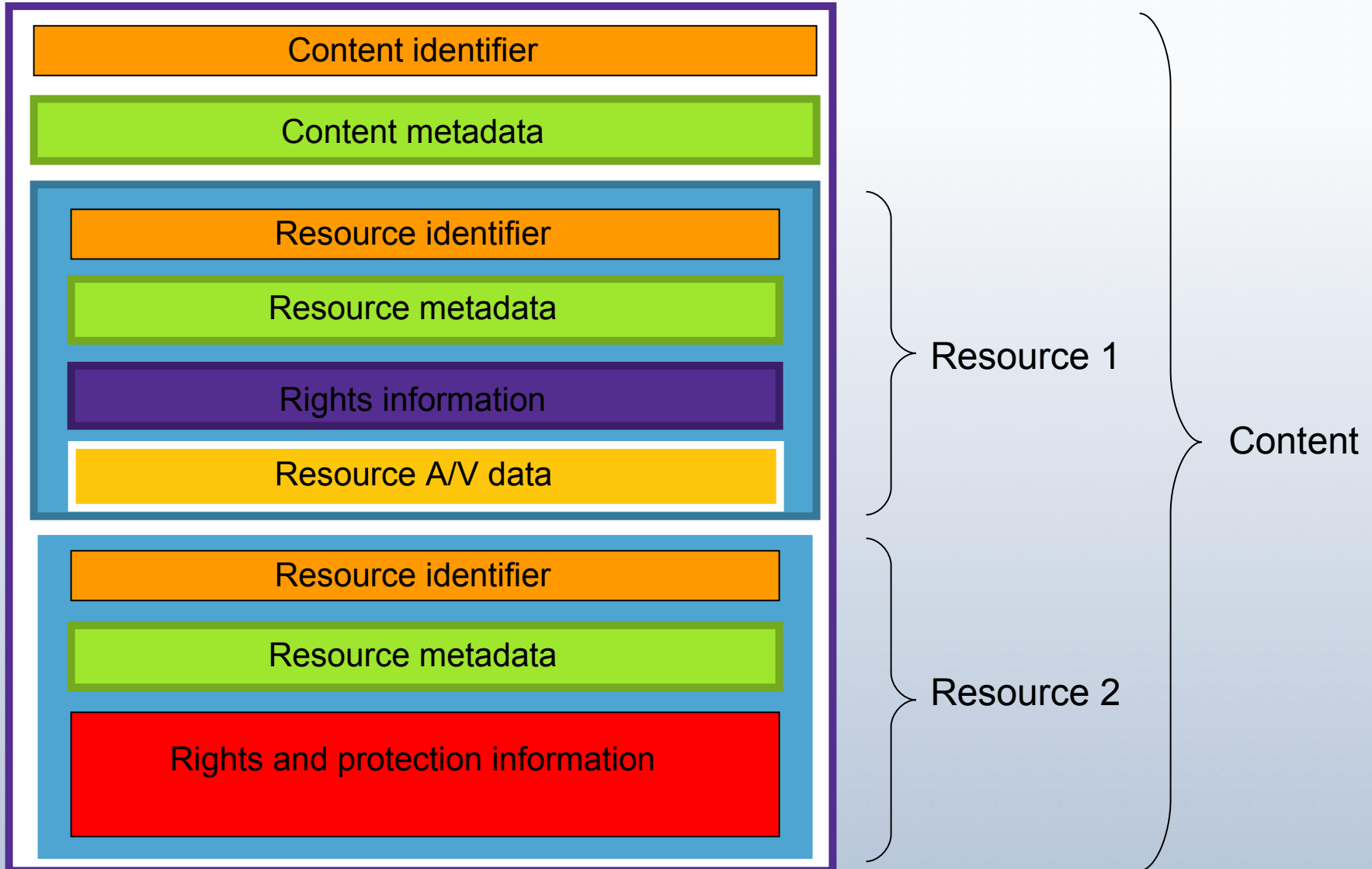
- The suite of ISO/IEC standards providing the technologies that help realise the vision of *diffuse trading* of digital content
- A multi-year project involving hundreds of experts at the global level

MPEG-21 fundamentals

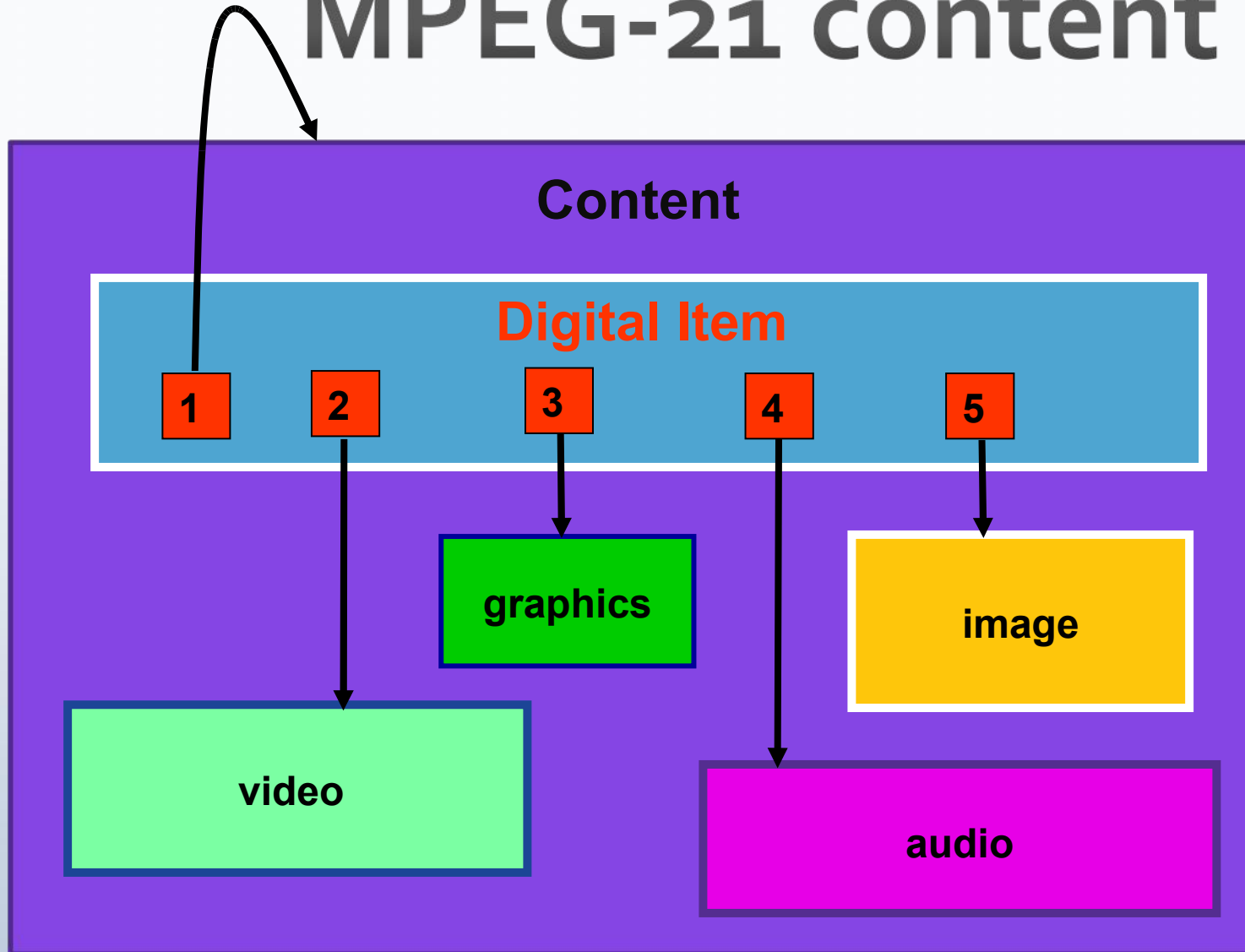
- **Digital Item:** a structured digital object with a standard representation, identification and metadata
- **User:** any Creator, End User or Intermediary that makes use of Digital Items in the MPEG-21 **framework** or interacts with other Users



Typical components in an MPEG-21 content item



MPEG-21 content



n

May contain

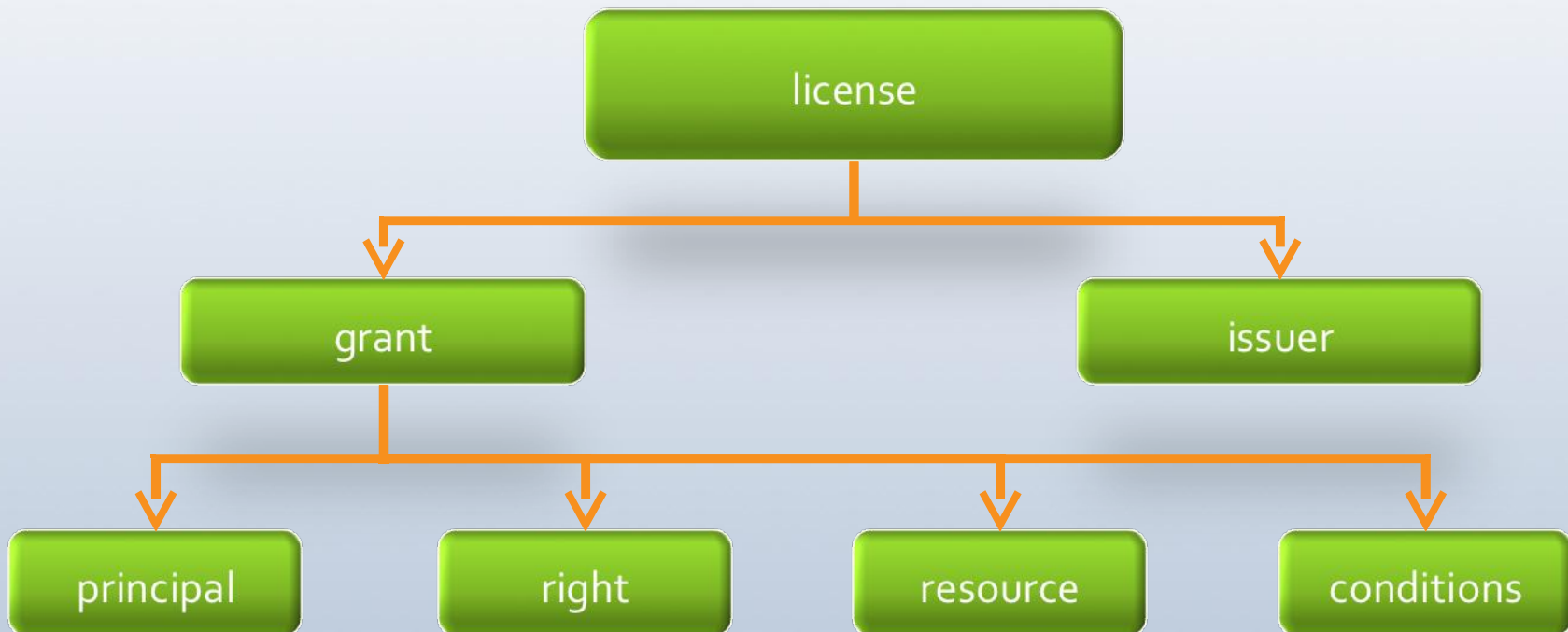
- Identifier
- Metadata
- DRM Info
- License
- Keys
- ...

Some MPEG-21 technologies

Technology	Purpose
Digital Item	XML structure for Resources, Metadata etc.
Digital Item Identification	Identification of DIs and components
IPMP Components	Rights Management and Protection Tools
Rights Expression Language	Language to express machine readable rights
Rights Data Dictionary	Semantics of verbs used in REL
Digital Item Adaptation	Information describing adaptation
Event Reporting	Request and communication of ERs
Digital Item File Format	File Format for DIs
Digital Item Streaming	Streaming Format for DIs
And more...	

MPEG-21 REL

ISO/IEC 21000 Information technology — Multimedia Framework — Rights Expression Language (2003)



Some REL rights

- **Adapt**
- Delete
- Delist
- Diminish
- Embed
- **Enhance**
- **Enlarge**
- Enlist
- Execute
- Export
- ExtendRights
- GovernedAdapt
- **GovernedCopy**
- **GovernedMove**
- Install
- Modify
- Move
- **Play**
- Print
- Reduce
- Uninstall

Example

<license>

<grant>

```
<keyHolder>
  <info>
    <dsig:KeyName>Alice end user</dsig:KeyName>
  </info>
</keyHolder>
```

Principal

<mx:play/>

Right

```
<digitalResource>
  <nonSecureIndirect URI="StreamingResource1"/>
</digitalResource>
```

Resource

```
<sx:territory>
  <sx:location>
    <sx:country>IT</sx:country>
  </sx:location>
</sx:territory>
```

Conditions

</grant>

<issuer>

```
<keyHolder>
  <info>
    <dsig:KeyName>Bob creator</dsig:KeyName>
  </info>
</keyHolder>
```

Issuer

</issuer>

</license>

MPEG-21 REL profiles

- ISO/IEC 21000-5:2004/Amd.1:2007, Part 5: Rights Expression Language AMENDMENT 1: MAM (Mobile And optical Media) profile
- ISO/IEC 21000-5:2004/Amd.2:2007, Information technology — Multimedia Framework — Rights Expression Language AMENDMENT 2: MPEG-21 REL profiles - the DAC profile
- ISO/IEC 21000-5:2004/Amd 3:2008, Part 5: Rights Expression Language AMENDMENT 3: OAC (Open Access Content) profile

The Open Access Content (OAC) MPEG-21 REL Profile

- Rights:
 - Play
 - Print
 - GovernedCopy
 - Adapt
 - GovernedAdapt
- Conditions
 - CopyrightNotice
 - NonCommercialuse

Examples:

- Attribution:

- Grant to everybody
 - the rights to Play, Print, GovernedCopy, Adapt
- at the following conditions:
 - CopyrightNotice (e.g. noticeType="ShowBeforeExercise", noticeType="BannerImage")



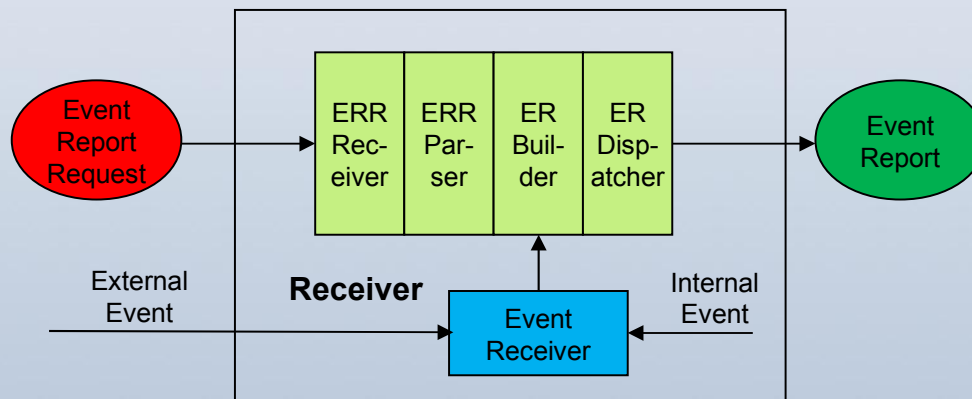
- Attribution-Non Commercial-Share Alike

- Grant to everybody
 - the rights to Play, Print, GovernedCopy, GovernedAdapt
- at the following conditions:
 - CopyrightNotice (e.g. noticeType="ShowBeforeExercise", noticeType="BannerImage")
 - NonCommercialUse



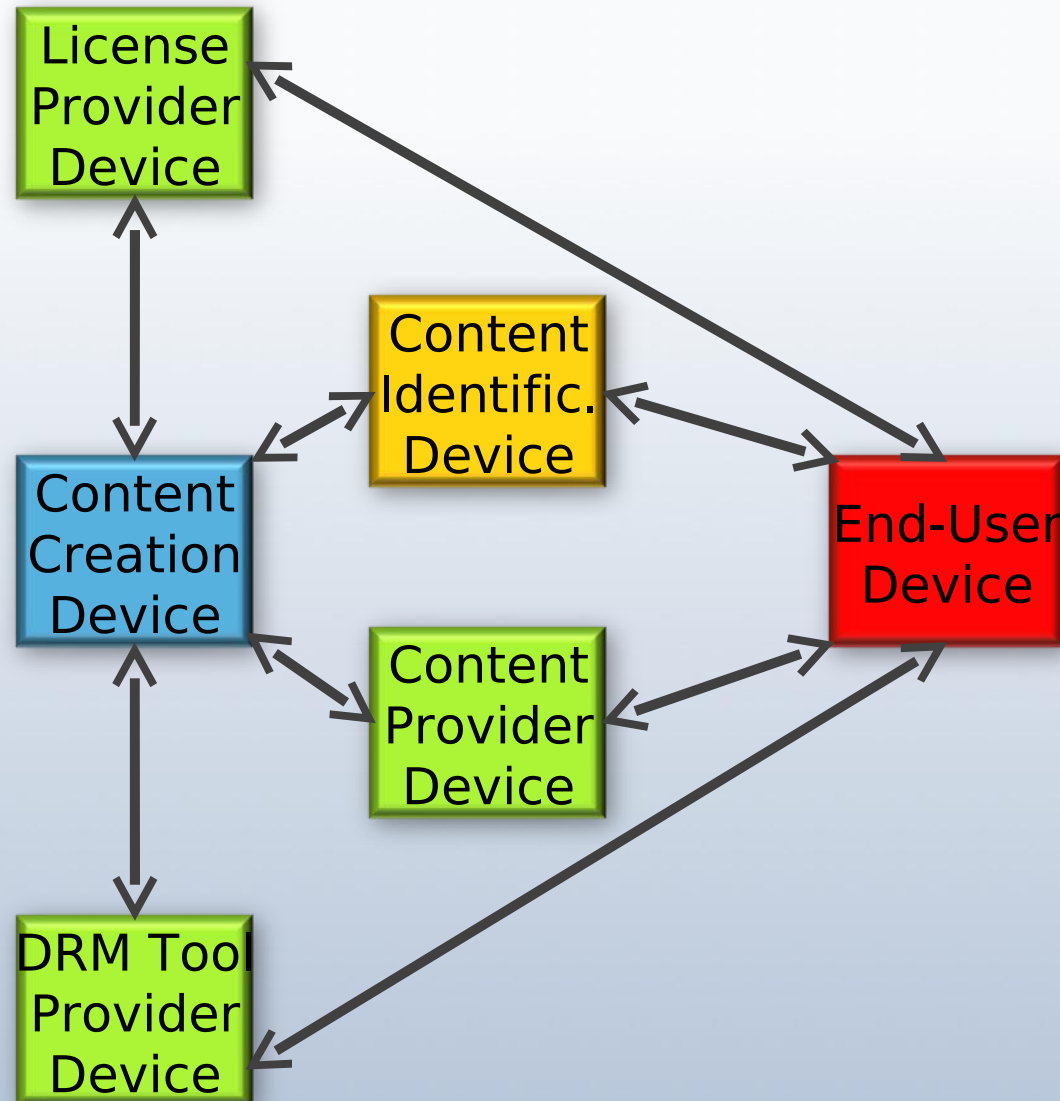
Event Reporting

- Allows creators to define Event Report Requests, which when received by the End-User application may trigger the generation of an Event Report
- A Rights Holder can add information to a DI
 - Description of Event;
 - Syntax/format of Event Report;
 - Recipient(s) of Event Report;
 - Parameters related to delivery of Event Report (e.g. time, delivery mechanisms)



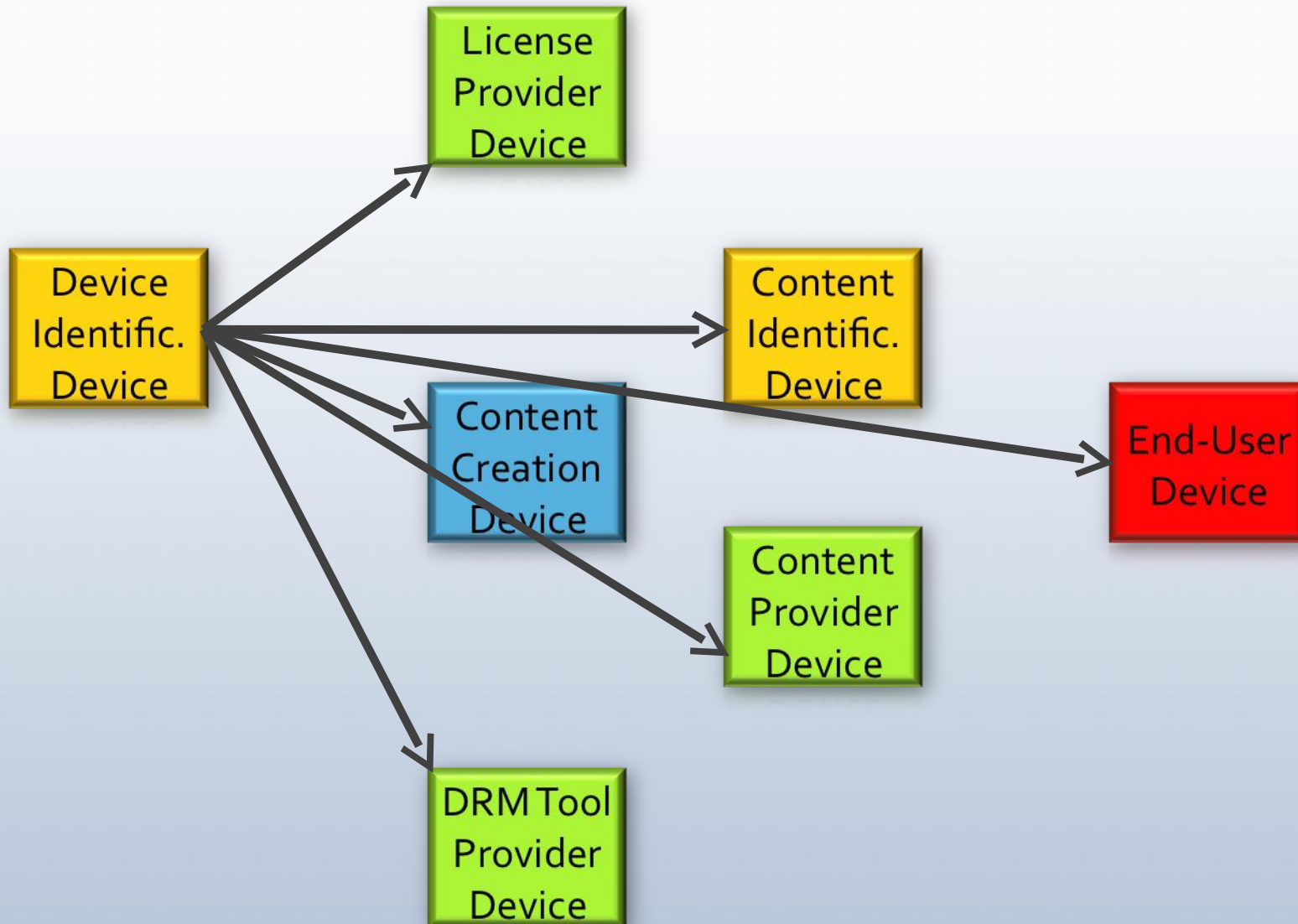
Media Streaming Application

Format Protocols



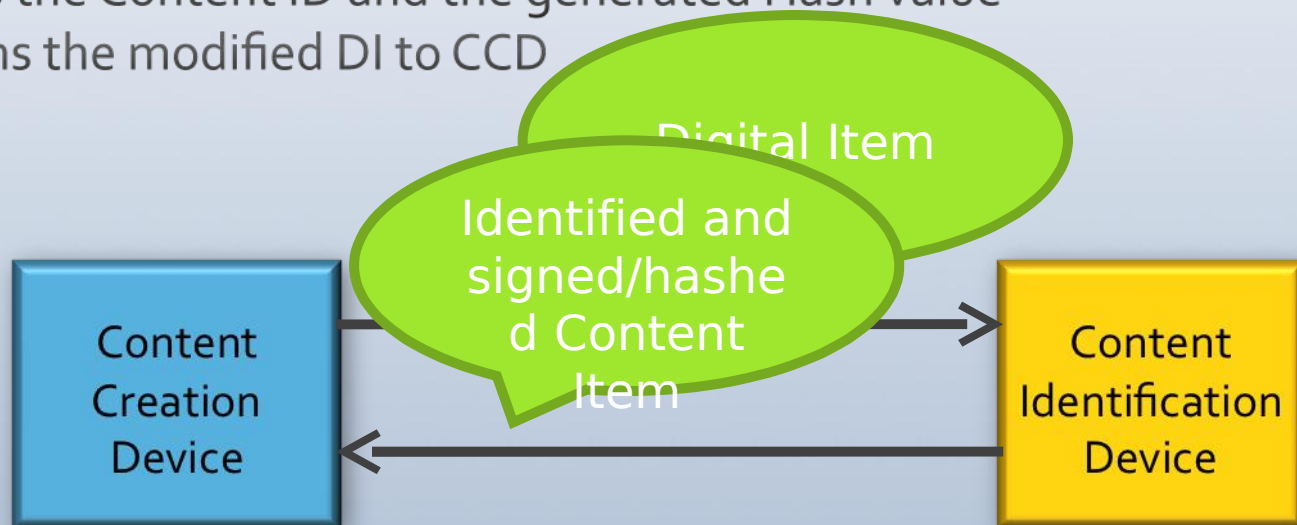
Media Streaming Application

Format Protocols



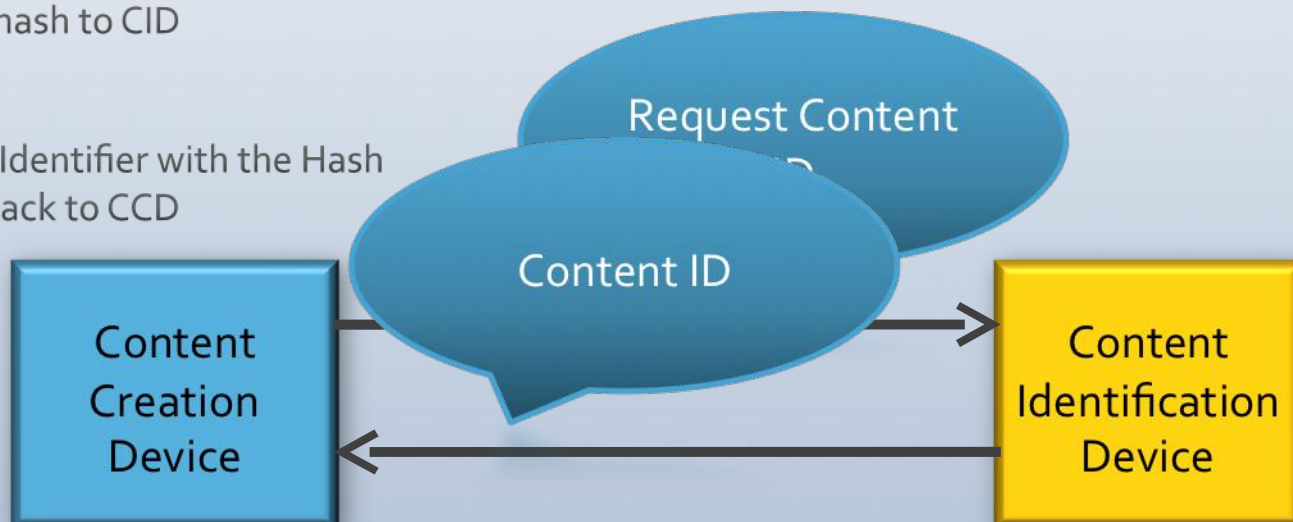
Content Identification Protocol/1

- CCD and CID mutually Authenticate
- CCD request a Content Identifier to CID by sending a DI
- CID
 - Assigns a new Content Identifier to the received DI
 - Adds the Identifier to the received DI
 - Digitally Signs or Hashes the received DI
 - Stores the Content ID and the generated Hash value
 - Returns the modified DI to CCD



Content Identification Protocol/2

- CCD and CID mutually Authenticate
- CCD request a Content Identifier to CID
- CID
 - Generates the requested Identifier
 - Returns Identifier to CCD
- CCD
 - Adds the received Identifier to the DI to be Identified
 - Computes the hash of the DI with the Identifier included
 - Sends hash to CID
- CID
 - Stores Identifier with the Hash
 - Sends ack to CCD



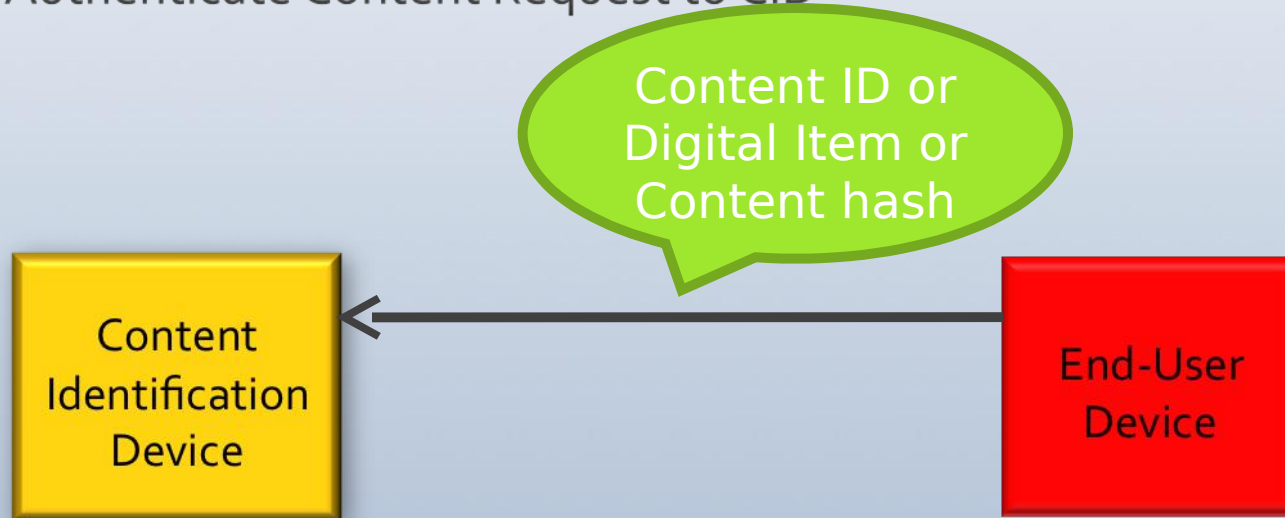
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- CID
 - Stores Identifier with the Hash
 - Sends ack to CCD



Content Authentication Protocol/1

- EUD and CID Mutually Authenticate
- EUD
 - Sends message containing
 - either:
 - Content ID of the Content Item to be Authenticated
 - DISignature element containing the hash value of DI (optionally)
 - Or
 - A DI Representing the Content Item to be Authenticated
 - Sends Authenticate Content Request to CID

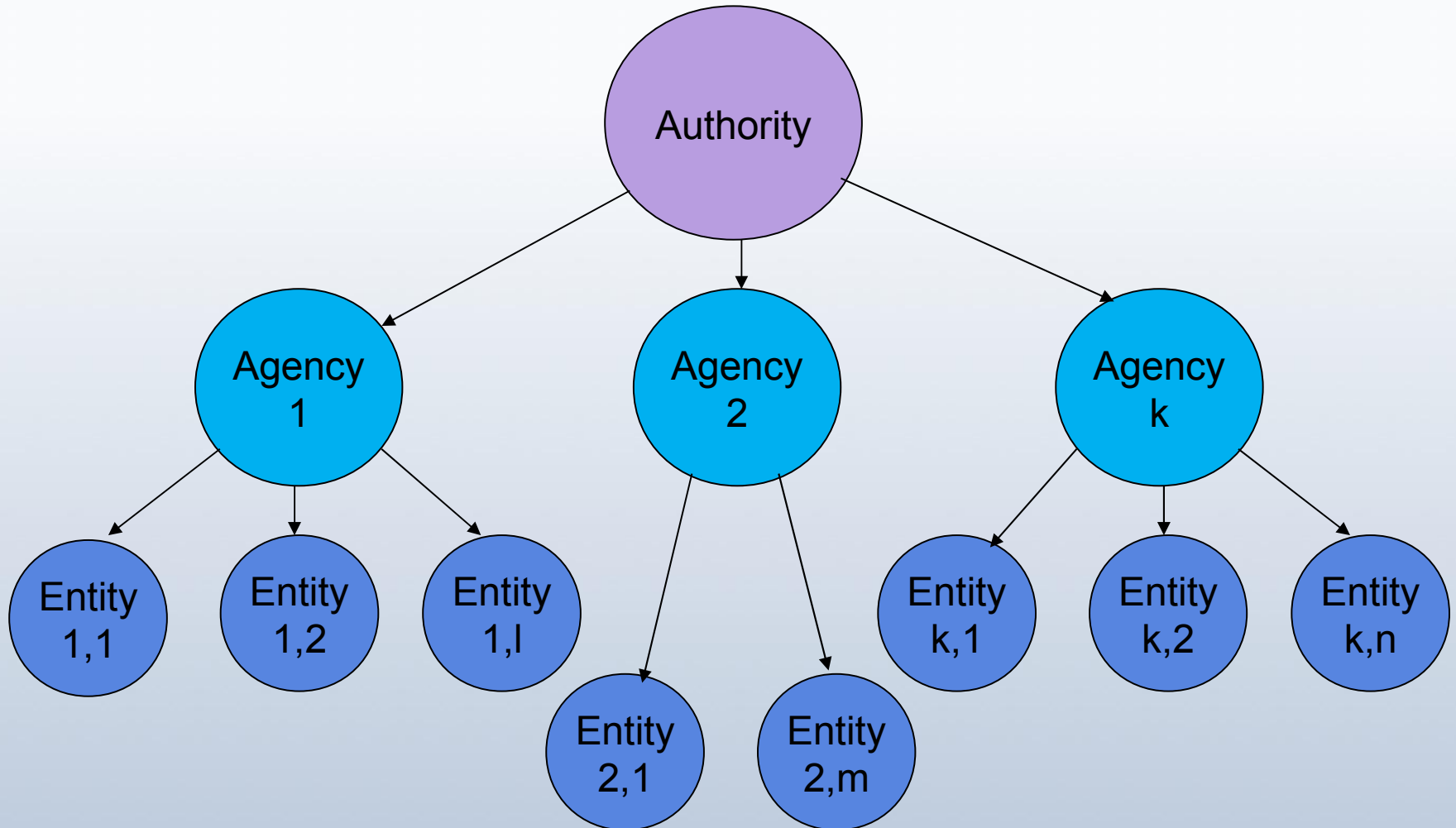


Content Authentication Protocol/2

- CID
 - Sends Authenticate Content Response message with
 - either:
 - The signature or hash of the Digital Item if this exists in the CID database (the Signature/Hash calculation and verification is left to EUD)
 - or:
 - The Authentication Result (the Signature/Hash calculation and verification is done by CID)



Content Identification Governance



Digital Item Streaming

BBL

Content Item

<did:didl>

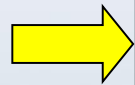
DI

</did:didl>



DIS Streaming
Fragmenting
Instructions for DI

DIS Instructions binding
DCI Packets to specific
transport mechanism



DIS

Processor



Streaming System
Handler



Streaming Server

0110

1100

Chillout software

Devices

LPD

CPD

TPD

CCD

EUD

DMD

RVD

DID

DoID

CID

Libraries

P2P

Auxiliary

Core

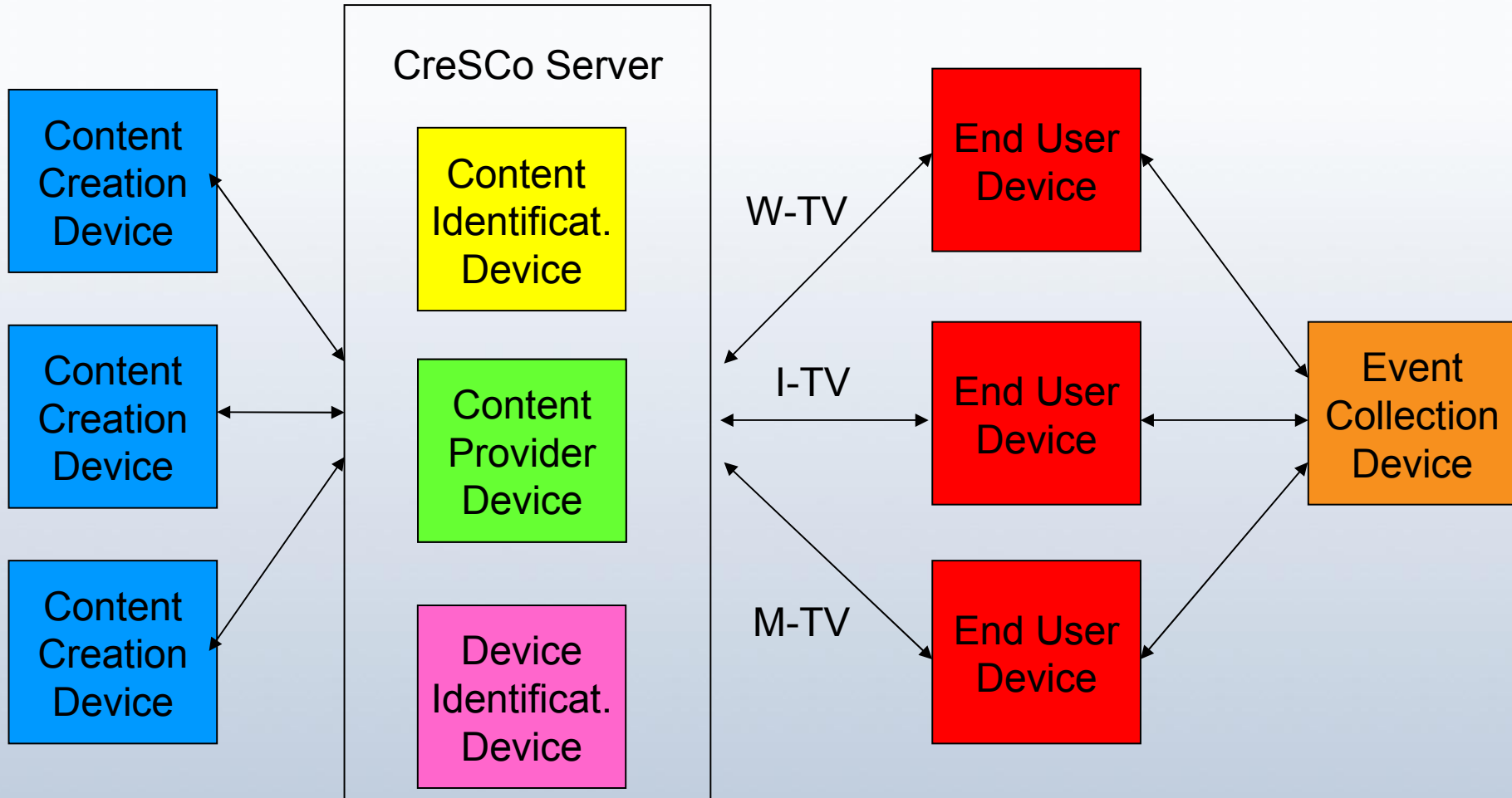
Media Framework

OS + Java platform + dependencies

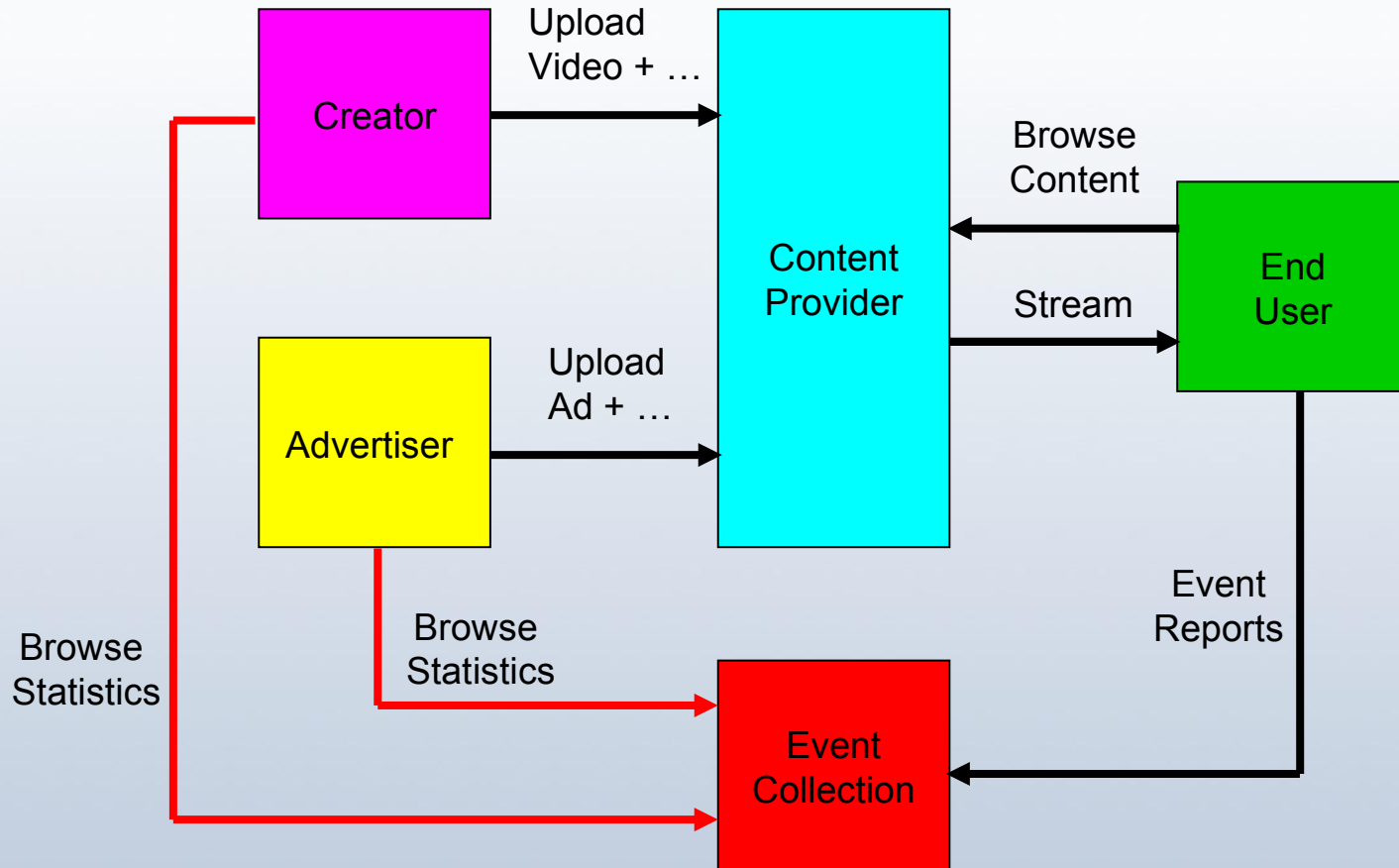
The CreSCo project

- Joint project between CEDEO.net, Sinapsi SPA and Politecnico di Torino, regionally funded
- Development of 2 key technologies: DIS, ER
- Integration of DIS, ER in Chillout
- Development of devices: CCD, CPD, EUD, ECD
- Trial system set up: wimtv.it
- Experimenting with streamed distribution of audio-visual content released with a Creative Commons licence

CreSCo architecture



The wimtv.it model



Thank you!



www.wimtv.it

filippo@smartrm.com